READERS' CORNER

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We can only answer questions or remarks of general interest to our readers, concerning projects not older than two years and published in *Elektor Electronics*. In view of the amount of post and email received, it is not possible to answer all correspondence, and we are unable to respond to individual wishes and requests for modifications to, or additional information about, *Elektor Electronics* projects.

Directional Microphone

In Elektor November 2003 on page 26 the author tells us that the low-pass filter frequency is determined by the combination R8 and C3 — this makes me sad. I believe the references should be to C7 and R9 (else I have taught all my students the wrong thing for more than 15 years !).

Also, I wonder, what is the meaning of resistors R19 -R30? As far as I can see they are all paralleled with P2 which is 'only' 1 kOhm. Besides, resistors R37-38 (470 Ohm) will work as RL's — when you look in the data-sheet from TI you'll see that all data are measured at RL> 10 kOhm. I've used the TCL2272 series and found that the distortion of these op-amps will be rather high (>1% at 1 kHz) when RL is smaller than 10 kOhm at an output swing greater than a few hundred milliVolts.

I think it's sad that Elektor Electronics brings articles with such essential faults !

Soeren Ploug, Denmark
(by email).

There's no reason for sadness caused by one typo. The reference to C3 in the formula on page 26 is wrong and should have been to C7 (see Corrections & Updates elsewhere in this issue). Still, the two components R8 and C7 are not related to the low-pass filter function, and no such statement is made in the article. Obviously, the low-pass filter roll-off frequency is determined by R9-C7, see also the inset at the end of the article and in particular, equation 16.

The function of R19-R30, then, is to prevent audible clicks in the output signal when the rotary switch is operated, which is achieved by providing a DC path to ground for all capacitors C11-C22 when they are not selected by S2. After all, the output of IC1.D is at roughly half the supply potential (you may have missed this point).

Contrary to what you seem to assume, the circuit does not provide any substantial amplification of the microphone signals. Even at extremely high volumes no more than about 8 mA of output current will flow (not counting the external load), which is way below the maximum of ±50 mA specified for the opamps used.

Flawed Mini Project

Dear Editor — your 'SuperCap Battery' article (October 2003, Ed.) suffers from a couple of design flaws I'd like to mention.

The Goldcap is discharged by R1 and R2, so a diode behind the charger circuit would have been in order. Without such a diode, you will be unable to justify the '2-mA under no-load conditions' claim made in the article, simply because the series combination of R1 and R2 already draws more at 2.3 V. An additional load is formed by the voltage regulator, because current flows into its output.

To use a reverse-biased transistor b-e junction as a Zener diode is ludicrous for a circuit supposed to be reproducible — the Zener voltage will stray far too much. Also, a transistor with higher gain (C-suffix version) would help to reduce the no-load current, as it would have allowed a higher value for R3 (approx. 4.7 kΩ). Diode D2 is clearly under-dimensioned. This diode can be expected to carry high currents as the full Goldcap voltage is applied to the load by way of the coil and the diode. In this position I would have liked to see a Schottky diode capable of passing in excess of 1 A, or failing that, an 1N4002 as the bare minimum. The statement that the coil resistance should be under 1 Ω is incorrect — although it stands to reason that the converter efficiency drops with coil resistance. I would have like to see this mentioned.

Finally, it would have been nice to see a graph with efficiency plotted against output current.

Dr T. Scherer

The missing diode was already noticed before we received your letter (see Corrections & Updates). It failed to show up in the circuit diagram because the author employs the charger and the step-up converter as separate units (as shown in the photograph). The ersatz Zener may look haphazard but in reality is a good choice because the only requirement for the Zener voltage is better stability than that of the battery. Also, the use of a reverse-biased transistor fits the bill of a Mini Project because most hobbyists will have a few spare transistors lying around but no Zener diodes. In our experience, the transistor-based Zener diode achieves an accuracy of about 10% which is more than adequate for this application.

A Goldcap, then, can be expected to pump a short-circuit current of up to 6 A, which defeats the use of a largish diode as you suggest and can only be stopped by a fuse. In the unfortunate event of a short-circuit, we'd rather see a small diode destroyed than the coil.

Arguably, every project publication can be optimised or extended in some respect. However, a Mini Project should be simple, brief and open to experiments.

CORRECTIONS & UPDATES

Rev Counter for R/C Models

November 2003, p. 56-61, 024111-1.

A 4.7 kΩ resistor should be inserted between pin 7 of IC1 and the base of T4. Without the series resistor, the comparator output is short-circuited to ground by way of the base-emitter junction of T4. The resulting current will however not damage the TLC272.

Electric Charge Meter

November 2003, p. 20-21, 030018-1.

On the PCB overlay, the symbols '+ ' and '–' near K2 should be swapped. This error does not affect the operation of the circuit.

Directional Microphone

November 2003, p. 24-30, 030046-1.

The equation in the article text on page 26 contains a wrong component reference and should be amended to read: $R8 = d / (c \cdot C7)$

USB-RS232 Interface

April 2003, p. 60-65, 0200375-1.

In the circuit diagram on page 62, the value of R10 should be amended to read: 100 kΩ. This does not affect the Components List or the PCB layout.

Supercap Battery

October 2003, p. 52-53, 030109-1.

Components IC1, R1 and R2 cause a rather too high discharge current of about 5 mA on the Goldcap battery. This can be prevented by an additional diode between the Goldcap and the LM317.